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REMARKS

Claims 1, 2, 4-9, 11-14, and 29-35 are all the claims pending in the application. Claims 3 and 10 have been incorporated into independent claims 1 and 8, and have been canceled. Claims 15-28 have been canceled pursuant to the previous response to restriction requirement. Claims 29-35 have been added to further define the invention. Claims 1, 2, 4-9, 11-14, stand rejected on prior art grounds. Applicants respectfully traverse these objections/rejections based on the following discussion.

I. The Prior Art Rejections

Claims 1, 2, 4-9, 11-14, stand rejected under 35 U.S.C. §103(a) as being unpatentable over Peterson et al., hereinafter "Peterson" (6,921,860) in view of Raiser et al., hereinafter "Raiser" (6,700,209). Applicants respectfully traverse this rejection because, among other reasons, the prior art of record does not teach or suggest the use of a "compressible" film surrounding sides of the solder connectors. To the contrary, the prior art of record constructs a dam out of a conventional conductor or solder mask material (which are generally rigid or non-compressible structures) to surround a solder connection.

More specifically, independent claims 1 and 8 define a "compressible film" around the solder connections and somewhat similarly define that this compressible film "has sufficient compressibility to accommodate expansion of said solder connections when said solder connections are melted without damaging said insulating material." The conventional conductor and solder mask materials of the dams 30 described in Peterson are non-compressible and do not have sufficient compressibility to accommodate the expansion of the solder connections as the connections are melted. Peterson is the only reference that is purported to teach a compressible film; however, Applicants respectfully

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submit that the solder mask material dams 30 described in Peterson are non-equivalent to the "compressible film" defined by independent claims 1 and 8.

More specifically, Peterson explains, in column 6, lines 14-18, that the dams 30 can comprise a conductive material or that the dams 30 are formed of a dielectric material, such as a conventional solder mask material. Such substances are not known by those ordinarily skilled in the art to be compressible. To the contrary, conductive materials such as metals, polysilicon, doped silicon, etc. are not flexible, but instead are rigid and brittle. Similarly, dielectric materials are generally non-compressible.

More importantly, Peterson is completely silent regarding any compressible nature of the dams 30. Any suggestion to modify Peterson so as to use a flexible material for the dams 30 is not found in the prior art of record and there is no indication that such a substitution of materials would be obvious. To the contrary, the only suggestion for using a compressible material surrounding solder connections lies within Applicants' disclosure. Therefore, even though Peterson does not teach or suggest the claimed "compressible film" there is also no suggestion in Peterson or any of the other prior art of record to substitute a compressible material for the non-compressible materials described in Peterson. This is especially true considering that the "compressible film" is defined in the claims to have "sufficient compressibility to accommodate expansion of said solder connections when said solder connections are melted without damaging said insulating material." Therefore, while one may argue that all substances must have some form of compressibility, the nature of the compressibility is clearly defined in the independent claims and the materials described in Peterson do not meet the structural requirements of independent claims 1 and 8.

With the inventive structure, the "compressible film" provides a volume into which the solder material can expand (before it reaches the underfill), thereby allowing the underfill to support the solder bumps even after numerous thermal excursions. The result is that the solders (lead and lead-free) can be used with other advantages without incurring the negative impact of solder volume expansion. Thus, the compressible material compresses to accommodate the change in size of the connector which avoids deforming the underfill. This allows the underfill to remain connected to the compressible material, the device, and the carrier regardless of the expansion of the

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conductor. Further, the compressible material will allow further accommodation of volume expansion during other downstream high temperature processes (card assembly, rework, etc.) as well. With the inventive use of the compressible material, the underfill will be able to provide the structural coupling required between the device and carrier to prevent undesirable delamination.

Therefore, the use of a "compressible film surrounding sides" of the solder connectors provides substantial advantages over the non-compressible materials that were used conventionally, such as those described in Peterson. Applicants note that Raiser is only relied on for teaching a carrier connected to the device and is not relied on for teaching the claimed "compressible film" or for modifying Peterson so that a compressible film would be substituted in place of the non-compressible materials discussed in Peterson.

Thus, Applicants respectfully submit that the prior art of record does not teach or suggest "a compressible film surrounding sides of said solder connectors, wherein said compressible film has sufficient compressibility to accommodate expansion of said solder connections when said solder connections are melted without damaging said insulating material" as defined by independent claim 1; "a compressible film surrounding sides of said lead-free connectors, wherein said compressible film has sufficient compressibility to accommodate expansion of said lead-free connections when said lead-free connections are melted without damaging said underfill" as defined by independent claim 8; or "a compressible film comprising one of a rubber and a foam surrounding sides of said solder connectors" as defined by independent claim 29. Therefore, it is Applicants' position that claims 1, 8, and 29 are patentable of the prior art of record. Further, dependent claims 2, 4-7, 9, 11-14, and 30-35 are similarly patentable, not only because they depend from a patentable independent claim, but also because of the additional features of the invention they define. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

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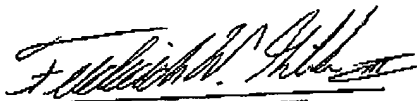
II. Formal Matters and Conclusion

In view of the foregoing, Applicants submit that claims 1, 2, 4-9, 11-14, and 29-35, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0458.

Respectfully submitted,


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